

WHAT IS CLAIMED IS:

- 5 1. A method for controlling a surface-based craft within an operational area, comprising:
- providing a tracking and command system coupled to the surface-based craft through a transceiver;
- generating an image of an operational area by the tracking and command system;
- 10 generating a path for the surface-based craft by the tracking and command system using the image;
- generating a set of craft commands for the surface-based craft by the tracking and command system using the path; and
- 15 transmitting the craft commands by the tracking and command system to the surface-based craft via the transceiver.
- 20 2. The method of claim 1, wherein generating a path for the surface-based craft further includes:
- identifying the surface-based craft's position within the operational area by the tracking and command system using the image;
- 25 identifying a target by the tracking and command system using the image; and
- determining a path between the craft's position and the target.
- 30 3. The method of claim 2, wherein the surface-based craft further includes an instrument suite and generating a path for the surface-based craft further includes:
- collecting surface-based information from the instrument suite by the craft;
- 35 transmitting the surface-based information from the

craft to the tracking and command system; and
generating a path for the surface-based craft
5 further using the surface-based information.

4. The method of claim 1, wherein the tracking and command system is airborne.

10 5. The method of claim 4, wherein the tracking and command system is supported by a lighter-than-air aircraft.

6. The method of claim 5, wherein the lighter-than-air aircraft is tethered.

15 7. The method of claim 5, wherein the lighter-than-air aircraft includes a thrust generating element.

8. The method of claim 4, wherein the wherein the tracking and command system is supported by a heavier-than-air aircraft.

9. The method of claim 1, wherein the surface-based craft includes means for collision avoidance.

25 10. A multi-agent autonomous system, comprising:
a tracking and command system, the tracking and command system including:
a transceiver;
30 an operational area imager; and
a surface-based craft path planning module coupled to the operational area imager and the transceiver; and
a plurality of surface-based craft coupled to the tracking and command system through the transceiver.

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11. The multi-agent autonomous system of claim 10, further comprising:

5 a surface-based craft position module coupled to the operational area imager and the path planning module;
 a reconnaissance target identification module coupled to the operational area imager and the path planning module.

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12. The multi-agent autonomous system of claim 10, wherein the surface-based craft further includes instrument suites.

13. The multi-agent autonomous system of claim 10, wherein
15 the tracking and command system is airborne.

14. The multi-agent autonomous system of claim 13, wherein the tracking and command system is supported by a lighter-than-air aircraft.

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15. The multi-agent autonomous system of claim 14, wherein the lighter-than-air aircraft is tethered.

16. The multi-agent autonomous system of claim 14, wherein
25 the lighter-than-air aircraft includes a thrust generating element.

17. The multi-agent autonomous system of claim 13, wherein the tracking and command system is supported by a heavier-than-air aircraft.
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18. The multi-agent autonomous system of claim 10, wherein the surface-based craft include means for collision avoidance.

35 19. A tracking and command system for controlling a surface-

based craft within an operational area, comprising:

 a processor;

5 a memory coupled to the processor, the memory having
program instructions executable by the processor stored
therein, the program instructions including:

 generating an image of an operational area;

 generating a path for the surface-based craft using
10 the image;

 generating a set of craft commands for the surface-
based craft using the path; and

 transmitting the craft commands to the surface-based
craft via a transceiver.

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20. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, the program instructions for generating a path for
the surface-based craft further including:

20 identifying the surface-based craft's position
within the operational area using the image;

 identifying a target using the image; and

 determining a path between the craft's position and
the target.

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21. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, wherein the surface-based craft further includes an
instrument suite and the program instructions for generating a
30 path for the surface-based craft further include:

 receiving surface-based information collected from
the instrument suite by the craft;

 transmitting the surface-based information from the
craft to the tracking and command system; and

35 generating a path for the surface-based using the

surface-based information and the image.

5 22. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, wherein the tracking and command system is airborne.

10 23. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, wherein the tracking and command system is supported
by a lighter-than-air aircraft.

15 24. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 23, wherein the lighter-than-air aircraft is tethered.

20 25. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 23, wherein the lighter-than-air aircraft includes a
thrust generating element.

25 26. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, wherein the tracking and command system
is supported by a heavier-than-air aircraft.

30 27. The tracking and command system for controlling an
autonomous surface-based craft within an operational area of
claim 19, wherein the surface-based craft further includes:
 a proximity sensor;
 a drive mechanism; and
 a controller coupled to the proximity sensor and
drive mechanism, the controller programmed to avoid
35 collisions using signals received from the proximity

sensor.

- 5 28. A multi-agent autonomous system, comprising:
 a self-propelled surface-based craft deployed in an
 operational area;
 a tracking and command system coupled to the
 plurality of surface-based craft, the tracking and
10 command system including:
 an imager for generating an image of the
 operational area;
 a path planer for planning a path for the
 surface-based craft using the image;
15 a craft command generator for generation of
 craft commands using the path; and
 a craft commander for transmitting the craft
 commands to the surface-based craft.
- 20 29. The multi-agent autonomous system of claim 28, further
 comprising:
 craft position determiner for determining the
 position and heading of the surface-based craft using the
 image;
25 a reconnaissance target identifier for identifying
 targets using the image.
- 30 30. The multi-agent autonomous system of claim 10, wherein
 the surface-based craft further comprises instrument suites
30 for collection of surface-based information.
- 35 31. The multi-agent autonomous system of claim 28, further
 comprising an aircraft for supporting the tracking and command
 system.

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32. The multi-agent autonomous system of claim 31, wherein
the aircraft includes a tether for tethering the aircraft.

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33. The multi-agent autonomous system of claim 31, wherein
the aircraft includes a thrust generating element for
maneuvering the aircraft.

10 34. The multi-agent autonomous system of claim 28, wherein
the surface-based craft further includes:

 a proximity sensor for detecting an object in close
proximity to the surface-based craft; and

 a controller, responsive to the proximity sensor,
15 for avoiding a collision with the object.

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